

DIRECT MODULATION OF A POWER AMPLIFIER WITH ADAPTIVE DIGITAL PREDISTORTION

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ABSTRACT

Techniques for direct modulation of a switching-mode power amplifier with adaptive digital predistortion are disclosed. A baseband digital modulated signal is decomposed into an amplitude signal and a phase signal in polar coordinates. The amplitude signal is used to modulate supply voltages of the power amplifier. The phase signal is used to modulate a voltage-controlled oscillator (VCO) of a phase-locked loop (PLL), which generates a phase-modulated radio-frequency (RF) carrier coupled to the input of the power amplifier. The digital predistortion is implemented by using a feedback demodulator, which regenerates the baseband amplitude and phase information from the output of the power amplifier. The VCO drift and other non-linear effects of the power amplifier are compensated. High power efficiency and high linearity for different modulation standards are achieved.